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Predictive Validity of Specialty Choice Data From AAMC Graduation Questionnaire

Thomas H. Dial, Ph.D., and Diane W. Lindley

Abstract—Several previous studies have used data from the Association of American Medical Colleges' annual graduation survey to address questions about medical students' specialty preferences. Only recently, however, has it become possible to test the validity of these data as indicators of the specialties in which students will actually receive training. Comparisons of 1983 graduation questionnaire data with data on the third-year residencies for the same cohort reveal that the specialty preferences indicated on the questionnaire were good predictors of the residency programs the respondents were in during the third year following graduation.

The graduation questionnaire (GQ) of the Association of American Medical Colleges (AAMC) is administered annually to all senior medical students. GQ data have been used in a number of studies dealing with medical students' residency and specialty plans (1–4). A question raised by these studies concerns the proportion of medical school graduates who actually enter the specialties they indicated as preferred on the GQ. It has become possible only recently to answer this question tentatively.

Methods

Two sources of data were used for the study reported here. Information on specialty plans was taken from the 1983 GQ. All 123 accredited M.D.-degree–granting medical schools in the United States participated in the 1983 survey, and the overall response rate was 66.3 percent of all U.S. medical school seniors. The GQ asks students who have decided on a definite specialty to report that choice and asks those undecided about a specialty to list their first three choices. The term "specialty preference" refers to the definite choices of those who said they had definite specialty plans and to the first choices of those who said they were undecided.

Data on residencies were obtained from the National Residency Matching Program (NRMP), which collects information on residents from teaching hospitals annually. The 1983 graduation class was the first for which it was possible to track GQ respondents through their residency training because NRMP data on residency training was added to the AAMC Student and Applicant Information Management System data base beginning with the 1983 class.

A file containing both the 1983 graduates' responses to the GQ and the resi-

The research reported here was supported in part by contract no. 240-84-0068 from the U.S. Department of Health and Human Services.

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dency data for their first three postgraduate years (PGYs) was created for use in this study. The data presented here were taken from that combined file and from the separate files from which it was made.

Results

Table 1 shows the distribution of the responses to the GQ question on preferred specialty, with subspecialties subsumed under 21 appropriate general specialties, and the analogous distribution for postgraduate-year-3 (PGY-3) residents in 1986. The question addressed by the comparison of the two distributions was whether an accurate estimate could be made based on GQ data of the proportions of graduates in a given year who would be in each respective residency category three years after graduation. This question disregarded whether the individuals who stated a particular specialty preference on the GQ were the same individuals who actually entered residencies leading to that specialty. Thus, it can be called a question about predictive validity at the aggregate as opposed to the individual level.

The percentage of PGY-3 residents in internal medicine in 1986 exceeded the percentage of GQ respondents who said in 1983 that they preferred internal med-

TABLE 1

Numbers and Percentages of 9,533 U.S. Medical Students in the 1983 Graduating Classes Who Preferred Each of 21 Specialties and Numbers and Percentages of 14,887 Third-Year Residents in 1986 Who Were in These Specialties*

Specialty	Students		Residents	
	No.	Percentage	No.	Percentage
Allergy and immunology	30	0.3	0	0.0
Anesthesiology	457	4.8	814	5.6
Dermatology	127	1.3	114	0.8
Emergency medicine	263	2.8	280	1.9
Family practice	1,444	15.1	2,004	13.8
Internal medicine	2,087	21.9	4,057	27.9
Neurosurgery	97	1.0	107	0.7
Neurology	146	1.5	197	1.4
Nuclear medicine	6	0.1	3	0.0
Obstetrics-gynecology	718	7.5	1,011	7.0
Ophthalmology	337	3.5	377	2.6
Orthopedic surgery	540	5.7	552	3.8
Otolaryngology	198	2.1	229	1.6
Pathology	252	2.6	418	2.9
Pediatrics	762	8.0	1,352	9.3
Physical medicine and rehabilitation	73	0.8	143	1.0
Preventive medicine	18	0.2	12	0.1
Psychiatry	450	4.7	761	5.2
Radiology	525	5.5	777	5.3
Surgery	852	8.9	1,145	7.9
Urology	151	1.6	185	1.3
Total	9,533	100.0	14,538	100.0

* Data on the students were from the 1983 Graduation Questionnaire of the Association of American Medical Colleges (AAMC), and data on the residents were from the AAMC Student and Applicant Information Management System. Data were unavailable on 948 students and 2,634 residents.

icine by 6.0 percentage points, the largest difference in the comparison. Conversely, in most other instances the percentage of residents in a particular residency category during PGY-3 was slightly smaller than the percentage of GQ respondents who stated a preference for that category. The percentage of graduates for whom PGY-3 residency data were unavailable, either because their status was unknown or because they were not in any residency program, was also larger than the percentage of GQ respondents who failed to provide specialty preference data. The Pearson product-moment correlation between the two distributions is .96, a finding that indicates an extremely strong similarity between the two distributions.

Table 1 shows that GQ data on specialty preference provide very respectable preliminary estimates, at least at the general specialty level, of the relative proportions of U.S. medical school seniors who actually will enter various residency programs and remain in those programs at least through PGY-3. The accuracy of a predictive model based on GQ data could perhaps be improved by making use of supplementary data, such as information on the position-to-candidate ratios in the various residency categories.

Table 2 displays data on GQ respondents for whom PGY-3 data were available ($n = 8,250$). It shows the overall percentage and the percentage in each of 21 specialty-preference categories of those who were in residencies leading to their preferred specialties as of PGY-3. Altogether, 87.2 percent of the graduates were in residencies consistent with the specialty preferences they had indicated on the GQ. In five of the 21 specialty-preference categories, the degree of consistency was 90 percent or greater. The two categories that contained the largest numbers of residents, family practice and internal medicine, were among those five.

TABLE 2

Percentages of 1983 U.S. Medical School Graduates Who Preferred Each of 21 Specialties Who in 1986 Were in Residencies Leading to Their Preferred Specialty*

Specialty	Percent (n = 8,250)
Allergy and immunology	0.0
Anesthesiology	89.4
Dermatology	63.3
Emergency medicine	65.0
Family practice	93.9
Internal medicine	92.9
Neurosurgery	74.1
Neurology	71.6
Nuclear medicine	0.0
Obstetrics-gynecology	87.1
Ophthalmology	86.5
Orthopedic surgery	74.3
Otolaryngology	79.9
Pathology	90.7
Pediatrics	92.3
Physical medicine and rehabilitation	88.4
Preventive medicine	25.0
Psychiatry	92.0
Radiology	88.0
Surgery	79.3
Urology	75.0
Overall	87.2

* Data on the students were from the 1983 graduation questionnaire of the Association of American Medical Colleges (AAMC), and data on the residents were from the AAMC Student and Application Information Management System.

In three specialty categories—preventive medicine, allergy and immunology, and nuclear medicine—fewer than 50 percent of those who gave these specialty preferences on the GQ were in PGY-3 residencies in the specialties. The lack of consistency between preference and actual residency in allergy and immunology is to be expected, as its certification requirements specify three years of preliminary graduate training in another field before beginning specialized training. The lack of consistency in preventive medicine and nuclear medicine may be explained by the fact that they were chosen

by few graduates and because data were missing on many of the residents who had expressed preferences for these specialties.

In those cases where PGY-3 residencies were inconsistent with senior year preferences, the residents tended to move into residencies in internal medicine from their initial choices. The number of GQ respondents (1,283) whose PGY-3 status was unknown or did not correspond to any of the 21 listed residency categories was more than four times as great as the number (313) who stated preferences for other specialties on the GQ but were in internal medicine residencies in PGY-3.

Discussion

The comparison of GQ and PGY-3 data reported here showed that specialty preference data from the GQ provide reasonably accurate preliminary indicators of the residencies that medical school graduates will enter, at least at the general specialty level, and in which they will remain at least through PGY-3. These GQ indicators offer an important advantage to researchers in that they are available three to four years before most of the graduates complete their residencies and enter practice. The disadvantage of this timeliness is a relatively small reduction in the precision and accuracy of prediction.

When the PGY-4 data for the class of 1983 become available, it will be possible to test the power of GQ data to predict correctly the graduates' subspecialty training.

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findings were 3 out of 3 (100 percent) for SP-1 and SP-2 and were 2 or 3 (67 to 100 percent) for SP-3. These overall results indicated that the information provided by SP-1 and SP-2 were consistently accurate while that provided by SP-3 were consistently less accurate. This last finding suggested that the quality of a simulation may be a function of the individual selected for the simulation. Given that minor inaccuracies could occur in live simulation, it is important to observe SPs frequently and adjust the simulation and, in the extreme, to modify the scoring of students' performance accordingly to account for inaccuracies in the simulation.

Given the limited number of observations, the present findings suggested that when different individuals are properly coached to simulate a patient problem, they can perform the simulation accurately and with a high degree of consistency even after repeated presentations during the course of a day. These findings can be further validated if the same study design could be applied to a large sample of patients and further improved by videotaping all student encounters so they can be reviewed for students' accuracy in recording information and hence for accuracy of the simulations themselves.

These findings are relatively important, since they may affect how best to schedule the SPs so that repetition and fatigue do not affect the accuracy of simulations. The schedule used for testing second-year medical students at SIU had each SP see a student every 25 minutes, with a 15 minute break after the third and ninth student and an hour for lunch after the sixth student. Each SP saw a total of 12 students in one day. Based on the results reported here, the authors suggest that 12 may be the maximum number of students an SP should encounter in one day. With appropriate coaching and use, the simulated-standardized patient can provide faculty members with a powerful and accurate technique to simulate and standardize live presentations of a case problem.

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Deans' Attitudes Toward Teaching Psychopharmacology And Rational Prescribing in Medical Schools

E. M. Sellers, M.D., Ph.D., Richard Wakeford, and Gail Somer

It is widely recognized that modern drugs have played a major role in the revolution that has taken place over the last 40 years in the care of the mentally ill. The number of psychiatric patients requiring prolonged stays in hospital has been reduced, and treatment has become more humane. However, psychoactive drugs have not been free of problems. Concern from inside the health professions and elsewhere has been widespread and has resulted in many attempts to make prescribing of these substances more rational (1–5). In this context, rational prescribing is logical prescribing sup-

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ported by scientific research in contrast to prescribing practices that are not so supported.

The problem of inappropriate prescribing of psychoactive drugs so concerned the World Health Organization (WHO) that in 1982 its Executive Board requested its director-general to take a major initiative in the field. As part of a program of activities designed to involve member nations, drug manufacturers, and medical institutions, the Executive Board sought "to intensify efforts aimed at improving prescription, delivery and utilization practices regarding psychoactive drugs, through educational programmes for physicians and other health workers" (6). In connection with a small workshop within this program, the authors contacted the deans of all of the medical schools in Canada, the United Kingdom (U.K.), and the United States to assess their opinions of a possible initiative on improving the teaching of "rational prescribing of psychoactive drugs." The authors report the findings of this survey in the present paper.

Methods

A 10-item questionnaire was devised and distributed in 1986. The items concerned the deans' feelings about the need for change in teaching prescribing of psychoactive drugs and about their likely response to initiatives for such change. Of 28 deans in the United Kingdom, 21 (75 percent) replied; however, only 19 of these completed questionnaires could be analyzed (68 percent). Of 143 deans in North America (N.A.) (Canada and the United States), 105 (73 percent) responded, and all were included in the analysis.

TABLE 1

Percentages of 19 Medical School Deans in the United Kingdom and 105 Deans in North America (Canada and the United States) Who Gave Opinions on 10 Items Concerning the Teaching of Rational Prescribing of Psychoactive Drugs, 1986*

Question	Agree		No Opinion		Disagree	
	U.K.	N.A.	U.K.	N.A.	U.K.	N.A.
Teaching left up to individuals by school	74	84	5	5	21	11
More needed to be done by medical schools	64	60	0	17	36	23
WHO educational advice not heeded by respondent	16	22	32	46	52	32
Respondent prepared to take initiative on changing teaching	69	54	11	21	20	25
Medical students' attitudes on prescribing no business of school	5	3	11	4	84	93
Respondent grateful for WHO's advice and recommendations	47	59	21	32	32	9
Guidance more effective if from licensing bodies	68	64	11	11	21	25
Broad specifications of aims and objectives for teaching helpful	74	85	11	8	15	7
Specific suggestions of methods and approaches for teaching helpful	58	78	26	8	16	14
No impact of WHO initiative at school	31	13	16	32	53	55

* The questions were answered on a 5-point scale that was reorganized into the three categories of responses used here. The five responses were: "agree," "tend to agree," "no opinion," "tend to disagree," and "disagree."

Results

Distributions and factor analysis of the responses were completed by use of SPSS-X summary statistics (7). Statistical analysis showed that the test items were reliable (Cronbach's alpha of 0.80).The data for Canada and the United States were combined because no differences between the responses were apparent and because the sample contained a small number of Canadian schools ($n = 16$). The five response categories were organized into three response categories: "agree" ("agree" and "tend to agree"), "no opinion," and "disagree" ("tend to disagree" and "disagree"). Table 1 presents the results.

Both the United Kingdom (74 percent) and North American (84 percent) deans agreed that "teaching of this subject is very much left up to individuals' and departments' inclinations." As to whether "medical schools should do more," 60 percent of the North American deans agreed, 17 percent had no opinion, and 23 percent disagreed. The opinions of the United Kingdom deans were more greatly divided; 64 percent agreed, and 36 percent disagreed. While their opinion as to whether medical schools should do more to teach rational prescribing was equivocal, the consensus of the U.K. deans was that it is a medical school's responsibility to develop students' attitudes on such matters. Substantial proportions of all deans (U.K., 69 percent; N.A., 54 percent) were prepared to undertake an initiative on such teaching, and a majority felt that specific suggestions on teaching methods and approaches would be helpful.

The deans' views of the WHO's role and impact presented several contrasts. A 59-percent majority of the North American deans reported they would be grateful for WHO's advice and recommendations (and only 9 percent disagreed), while the United Kingdom deans' opinions were more evenly divided (47 percent, "agree"; 32 percent, "disagree"). A majority in both groups felt that guidance in educational policy would have more effect if it came from licensure bodies.

Discussion

Problems have been identified with respect to teaching rational prescribing: such teaching is not integrated into all appropriate courses and not coordinated from year to year in the curriculum; excess emphasis on lectures; and lack of opportunities for students to practice rational prescribing (3, 5, 6).

The deans' opinions reported in the present study give an important perspective on the likelihood that these problems can be addressed. Most of the deans felt that developing students' attitudes about rational prescribing of psychoactive drugs is an appropriate concern of medical schools. However, between 20 and 25 percent of them were not prepared to undertake an initiative on such teaching. In such schools the lack of the deans' support would likely preclude most major changes (8). Furthermore, recommendations, initiatives, and working groups from such international and remote organizations as the WHO apparently do not have impact locally. The deans' responses indicate that they would like general guidance and specific ideas but apparently were confronted with many local factors that must be considered. Traditional medical schools are typically organized by discipline and department. Psychopharmacology and rational prescribing do not fit into this structure because they cross many disciplines. Rarely are medical curricula organized to deal with such a multidisciplinary topic; by default, the teaching is left to individual instructors.

The implementation of curriculum change in medical schools must confront many practical problems, as described by the first author and colleagues in a paper presented at the First Cambridge Conference, an international workshop on clinical assessment held at Churchill College, Cambridge, England, in 1984. An alternative or complementary strategy for instituting change is suggested by the importance the deans assigned to direction from licensure and examination bodies. Those interested in increasing the extent of education in prescribing psychoactive drugs might focus on changing the content of licensing examinations.

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